



Australian Bureau of Statistics

Education Services

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Resources



MATE 2 – Migration

You can download this activity, the teacher solutions and the assessment rubric as a rich text file (RTF) at the bottom of the page.

Subject Area

Mathematics

Overview

This activity guides students through how to use the interactive graph of migration data. Changes in Estimated Resident Population, Median Age and Sex Ratio for 25 countries of birth is investigated for the period 1996 - 2009.

Requirements

Computer
Internet connection
Copy of student worksheet

Instructions

Working with Google Motion Charts

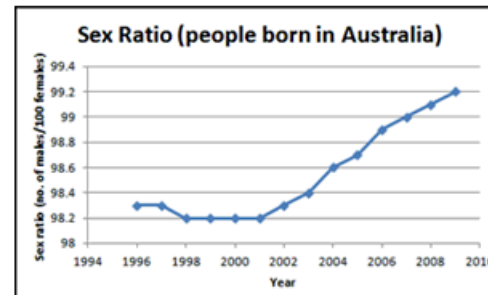
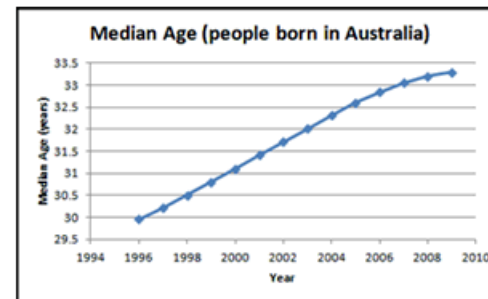
Background:

The Australian Bureau of Statistics (ABS) collects information on a range of topics including population. In this activity you will look at data about the median age and sex ratio of Australian residents from 1996 to 2009. You will also use Google motion charts provided through ABS Education Services to look for interesting statistics related to Australian residents' country of birth.

The following table and graphs show sex ratio and median age for residents born in Australia.

Year	ERP *	Sex Ratio	Median Age
1996	14,052,080	98.3	29.96
1997	14,203,110	98.3	30.22
1998	14,379,130	98.2	30.51
1999	14,556,540	98.2	30.8
2000	14,741,340	98.2	31.1
2001	14,931,180	98.2	31.41
2002	15,066,680	98.3	31.71
2003	15,201,260	98.4	32.02
2004	15,330,820	98.6	32.32
2005	15,467,770	98.7	32.6
2006	15,607,820	98.9	32.85
2007	15,777,310	99	33.05
2008	15,953,490	99.1	33.2
2009	16,138,850	99.2	33.3

TABLE 1: cat. no. 3412.0 Migration Australia, 2008-09



We can see from the table and from the graph that the median age of people who were born in Australia increased from about 30 years in 1996 to over 33 years in 2009. In other words in the 13 years from 1996 to 2009 the median age for this group rose by 3.3 years. This is a rise of about 0.25 of a year or 3 months for every year. Sex ratio is defined as the number of males for every 100 females. In 1996 there were 98.3 males for every 100 females. By 2009 this had increased to 99.2.

In this activity you are going to use an ABS interactive graph to look at different representations that show changes in sex ratio and median age of residents whose country of birth is **not** Australia.

* Once every 5 years, the ABS undertakes the Census of Population and Housing which counts the entire Australian population. In each year between Censuses, the ABS estimates the population. The Estimated Resident Population (ERP) is the official measure of the population of Australia, and is based on the concept of usual residence. It refers to all people, regardless of nationality, citizenship or legal status, who usually live in Australia, with the exception of foreign diplomatic personnel and their families.



Classifying countries

1. Open the ABS classification of countries on <http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/2901.0Chapter1102011> Place each of the following countries in alphabetical order under its correct heading: Bangladesh, Burma, Chile, China, Croatia, Cyprus, France, Greece, Indonesia, Iran, Ireland, Italy, Korea Republic of, Malaysia, Mauritius, New Zealand, Papua New Guinea, Philippines, Poland, South Africa, Sri Lanka, Sudan, Turkey, UK

Note: SAR is Special Administrative Region

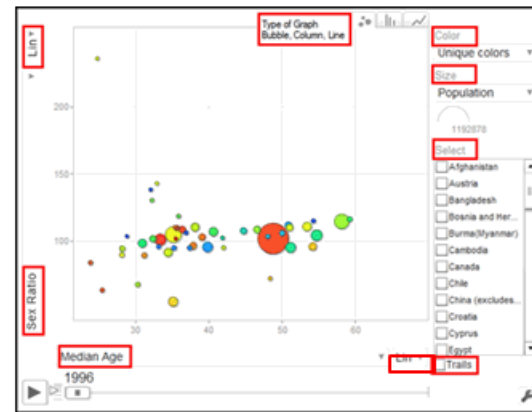
Oceania and Antarctica	North-West Europe	Southern and Eastern Europe	North Africa and the Middle East	South East Asia	North-East Asia	Southern and Central Asia	Americas	Sub-Saharan Africa
Fiji	Austria	Bosnia and Herzegovina	Egypt			Afghanistan	Canada	
				Cambodia	Hong Kong			
	Germany		Iraq		Japan	India	United States of America	Zimbabwe
		Former Yugoslav republic of Macedonia	Lebanon			Nepal		
	Netherlands				Taiwan	Pakistan		
		Hungary		Singapore				
				Thailand				
		Malta		Vietnam				
		Russian Federation						
		Serbia (includes Kosovo)						

Understanding the Google Motion Chart default settings

Go to the ABS Education Services homepage and in the Data, Stats and Graphs rectangle select Population Datasets and Interactive Graphs. Next click on the Interactive Graph icon for Population 1. This graph, using Google Motion Charts, allows you to run median age and sex ratio data as a bubble graph, column graph or a line graph. It uses data from the top 25 countries of birth for residents born outside Australia. Note that the data on Serbia is included for 2006 to 2009 only.

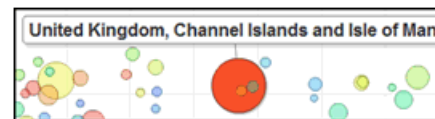
The view at the right uses the following default settings:

- Type of Graph: Bubble
- Colour: Unique colours
- Size (of bubble): Population
- Select countries: None selected
- Trails: Not selected
- X axis: Median age
- Y axis: Sex Ratio
- Scale: Linear
- Year: 1996



In this view we can see bubbles of varying size and colour. The larger the bubble the bigger the population. The largest orange dot represents the United Kingdom, Channel Islands and the Isle of Man. If you hover the cursor on the dot, its name will appear and you can read that, in 1996, the number of residents born here was 1,164,140. You also see that the median age of people born in the UK was 48.8 and the sex ratio was 102.

If you click on the dot its name will attach.



2. What other information can we read from the graph?

- The second largest dot is yellow. Name the country, how many residents were born there, the median age and sex ratio. Present this information in a sentence.
- Provide the same information for the dot in the uppermost left hand corner.
- Describe the main ways that the UK population varies from the Nepalese population?

Changing the default settings

3. Now let's see what we can discover when we change the default settings.

- In the drop down list for 'Colour', change the setting from 'Unique Colours' to 'Population'. Name the countries from where the third and fourth largest populations of Australian residents were born.
- Press the play button to run the animation. Describe how the top four countries by population change in the years 1996 to 2010. Make sure those countries are labelled to make it easier to see.

- c) For 2010, reading from the x scale (median age) what were the three countries with the highest median age? Using the classification of countries, comment on any regional pattern you notice.
- d) Reading from the y scale (sex ratio) what were the three countries with the highest sex ratio? Comment on any regional pattern you notice.
- e) Select the second tab on the top of the graph and change the graph type to column graph. You will see that this change affects the axes titles. In the drop down list for the y axis change the setting from 'Sex Ratio' to 'Population'. What are the advantages and disadvantages of this view?
- f) Change the graph to the line graph. If you need to change the viewing window click on the lines of any countries you can't see in full or click on the spanner icon. What information does this graph show more clearly? Describe one or two interesting features that could lead to further investigation.
- g) Change the y axis to Sex Ratio. Click on Nepal and the next two highest sex ratios in 2010. Also click on the lowest value. Click on the spanner in the bottom right of the screen and change the slider to 0% opacity. How does this change the display?
- h) Select two of these countries and describe how the sex ratio has changed over from 1996 to 2010.

Migration Patterns

The table below shows ERP for 1996 and 2009 as both raw number and as percentage.

- i) Look at the percentage increase in ERP. Describe any regional pattern in the countries with the 10 greatest increases and those with the 10 lowest increases (or greatest decreases).

Country of Birth	ERP		change	% change	Median Age	
	1996	2009			1996	2009
Australia	14,052,080	16,138,850	2,086,770	14.9%	29.96	33.3
Fiji	40,490	61,440	20,950	51.74%	33.76	40.22
New Zealand	315,050	529,180	214,130	67.97%	35.17	38.85
Papua New Guinea	26,380	30,720	4,340	16.45%	28.17	38.86
Austria	22,660	20,730	-1,930	-8.52%	54.25	62.6
France	17,040	29,270	12,230	71.77%	41.86	39.46
Germany	120,760	128,830	8,070	6.68%	51.15	60.63
Ireland	55,980	70,010	14,030	25.06%	46.58	45.59
Netherlands	95,340	89,910	-5,430	-5.70%	53.38	62.33
UK	1,164,140	1,188,250	24,110	2.07%	48.77	53.25
Bosnia and Herzegovina	19,170	37,640	18,470	96.35%	36.91	46.21
Croatia	56,840	69,070	12,230	21.52%	50.84	58.75
Cyprus	22,550	21,090	-1,460	-6.47%	48.04	58.6
Fmr Yugoslav Rep of Macedonia	47,590	49,740	2,150	4.52%	44.73	53.79
Greece	141,750	128,610	-13,140	-9.27%	54.69	65.6
Hungary	27,250	22,950	-4,300	-15.78%	59.19	65.36
Italy	259,130	219,340	-39,790	-15.36%	58.11	66.98
Malta	55,630	49,530	-6,100	-10.97%	51	62.28
Poland	70,900	59,330	-11,570	-16.32%	54.16	56.63
Russian Federation	16,940	21,650	4,710	27.80%	48.36	41.31
*Serbia (includes Kosovo)	42,150	42,090	-60	-0.14%	51.45	53.06
Egypt	37,880	40,720	2,840	7.50%	49.99	55.25
Iran	17,910	31,560	13,650	76.21%	35.88	38.48
Iraq	15,460	45,670	30,210	195.41%	32.24	35.84
Lebanon	77,580	89,860	12,280	15.83%	38.13	46.35
Sudan	2,640	25,660	23,020	871.97%	35.37	25.9
Turkey	32,020	39,470	7,450	23.27%	35.61	43.96
Cambodia	23,850	30,420	6,570	27.55%	33.17	41.38
Indonesia	47,740	69,690	21,950	45.98%	32.38	32.1
Malaysia	83,040	129,580	46,540	56.05%	34.46	37.1
Philippines	102,680	168,500	65,820	64.10%	35.14	39.54
Singapore	31,390	56,480	25,090	79.93%	31.22	34.27
Thailand	20,620	48,660	28,040	135.98%	25.48	29.68
Vietnam	164,160	203,850	39,690	24.18%	33.4	41.78
China (excludes SARs and Taiwan)	121,150	350,980	229,830	189.71%	39.84	34.61
Hong Kong	77,060	88,530	11,470	14.88%	30.94	35.78
Japan	25,660	51,010	25,350	98.79%	30.31	31.28
Korea, Republic of (South)	32,600	94,700	62,100	190.49%	28.21	28.38
Taiwan	21,240	36,530	15,290	71.99%	23.89	30.24
Afghanistan	6,350	24,750	18,400	289.76%	28.86	28.69
Bangladesh	5,550	25,450	19,900	358.56%	32.09	30.65
India	84,780	308,540	223,760	263.93%	40.63	30.15
Nepal	1,610	24,660	23,050	1431.68%	24.79	25.19
Pakistan	9,160	27,890	18,730	204.48%	32.92	30.64
Sri Lanka	51,970	87,410	35,440	68.19%	39.09	41.38
Canada	27,430	43,040	15,610	56.91%	35.27	37.88
Chile	26,570	28,540	1,970	7.41%	37.4	46.22
United States of America	54,310	81,130	26,820	49.38%	36.39	37.38
Mauritius	18,950	26,340	7,390	39.00%	42.01	45.59
South Africa	61,750	149,020	87,270	141.33%	37.86	38.02
Zimbabwe	9,960	30,330	20,370	204.52%	35.48	36.4
All other countries	390,070	488,210	98,140	25.16%	34.01	36.82

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Student Worksheet

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